

DEPARTMENT OF INDUSTRIAL ENGINEERING AND
MANAGEMENT SYSTEMS

College of Engineering and Computer Science

Graduate Program Handbook

2018-2019

Master of Science in Industrial Engineering (MSIE)
Master of Science in Engineering Management (MSEM)
Master of Science (MS)

Contact:

Ahmad Elshennawy

Graduate Director

ahmad.elshennawy@ucf.edu

Engineering 2, Room 312

Graduate Program Handbook 2018-2019

INDUSTRIAL ENGINEERING

Industrial Engineering and Management Systems is the engineering discipline that focuses on the design, management, and improvement of systems, products, and processes. Industrial engineers and engineering managers use many analytical approaches to improve productivity, safety, and quality of working life while reducing operating costs; they work to continuously improve the design of systems, processes, or products; and they design systems that translate a specific product design into a physical reality in the most productive manner and with highest possible quality. Industrial engineers and engineering managers are needed in all industry sectors such as manufacturing, healthcare, entertainment, information technology, and many others. The industrial engineer and engineering managers are responsible for making decisions regarding the utilization of people, materials, machines, and automation (including robotics). Industrial engineers and engineering management graduates are also skilled in Engineering Economic Analysis and Information Management, since they are generally considered to be the natural interface between the technical specialist and business management personnel.

The Industrial Engineering approach is characterized by a systematic evaluation of alternatives using quantitative analysis, modeling, physical and computer simulations. As such, quantification and measurement play a key role in the day to day activities of the industrial engineer.

ADVISING AND MENTORING

The IEMS Graduate Program Coordinator/ Graduate Director is assigned as the Graduate Advisor for all students first entering IEMS Master's and Doctoral programs. During the course of study, a student may develop a working relationship with a faculty member in the area of study he/she is pursuing and may request to the Graduate Advisor that the faculty member be assigned as his/her advisor.

A Master's or Doctoral student who pursues the thesis option or dissertation, respectively, will be responsible for developing the thesis/dissertation topic and convincing the potential advisor that it is a worthy topic and that the advisor should be willing to commit significant time to advising the student on the topic.

The student, with the guidance of the advisor, next identifies other faculty members to serve as Thesis Advisory Committee, consisting of at least three members who are approved members of the Graduate Faculty or Graduate Faculty Scholars ([Graduate Faculty](#)). This committee will recommend to the Dean of the college regarding the student's program of study, provide continual guidance for

the student, and be the principal mechanism for the evaluation of the student's thesis and performance in any general examinations. At least two members of the Thesis Advisory Committee must be Graduate Faculty, one of whom must serve as the chair of the committee. Graduate Faculty Scholars may serve as a member or co-chair of a thesis advisory committee but may not serve as the chair.

The recommended course of action is to involve the committee members early in the process. This gives the student the advantage of being able to make use of his/her advisors expertise and avoids any surprises when the student may think the thesis/dissertation is completed.

The thesis/dissertation committee must be formed prior to the student registering for thesis/dissertation hours. With the case of a thesis committee, the chair of the committee and one other member must be from the IEMS Department. With a dissertation committee, three members must be from the IEMS Department, and one must be from outside the Department.

Committee membership must be approved by the program director and submitted to the College of Graduate Studies. All members must be in fields related to the thesis topic. The UCF College of Graduate Studies reserves the right to review appointments to a Thesis Advisory Committee, place a representative on any Thesis Advisory Committee, or appoint a co-chair. A student may request a change in membership of the Thesis Advisory Committee with the approval of the program director and re-submission to the College of Graduate Studies. Additional information regarding the criteria for serving as a member, co-chair, or chair of a Thesis Advisory Committee is provided in the updated [Graduate Policy Guide](#).

INTRODUCTION

Together, the [Graduate Student Handbook](#) and your graduate program handbook should serve as your main guide throughout your graduate career. The [Graduate Student Handbook](#) includes university information, policies, requirements and guidance for all graduate students. Your program handbook describes the details about graduate study and requirements in your specific program. While both of these handbooks are wonderful resources, know that you are always welcome to talk with faculty and staff in your program and in the Graduate College.

DEPARTMENT/GRADUATE ADMINISTRATION

Chair of the Department:

Waldemar Karwowski, Ph.D., D.Sc., d.h.c, P.E., C.P.E., ENG2 Room 312-D, (407) 823-0042

E-mail: wkar@ucf.edu

Associate Chair and Graduate Director:

Ahmad Elshennawy, Ph.D., CLSSMBB, ASQ CQE, CRE; ENG2 Room 312-C, (407) 823-5742

E-mail: ahmad.elshennawy@ucf.edu

Administrative Staff

- Liz Stalvey, Coordinator, Administrative Services and Assistant to the Chair, ENG2 312-E, (407) 823-5759, E-mail: Liz.Stalvey@ucf.edu
- Ricardo Scuotto, Graduate Admissions Specialist, Eng. II – 312-G, (407) 823-0231, E-mail: Ricardo.Scuotto@ucf.edu:

Master of Science in Industrial Engineering (MSIE)

PROGRAM DESCRIPTION:

The Department of Industrial Engineering and Management Systems offers a Master of Science in Industrial Engineering (MSIE) degree focusing on the design and improvement of systems, products, and processes. This degree is available to those applicants with a Bachelor of Science degree in Industrial Engineering (BSIE) or other Engineering degree ONLY.

A total systems approach is used to optimize the various aspects of operations in both manufacturing and service industries. Industrial engineers use many analytical approaches to improve productivity, safety, and quality of working life while reducing operating costs. The MSIE curriculum builds on an undergraduate engineering degree to develop a stronger systems focus and analytical capability.

The industrial engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Please note: This program may be completed online, although not all elective options or program prerequisites may be offered online. Newly admitted students choosing to complete this program exclusively via UCF online classes may enroll with a reduction in campus-based fees. See <http://ucf.edu/online> for more information.

International students (F or J visa) are required to enroll in a full-time course load of 9 credit hours during the fall and spring semesters. Only 3 of the 9 credit hours may be taken in a completely online format. For a detailed listing of enrollment requirements for international students, please visit <http://global.ucf.edu/>. If you have questions, please consult UCF Global at 407-823-2337.

UCF is not authorized to provide online courses or instruction to students in some states. Refer to [State Restrictions](#) for current information.

PROGRAM CURRICULUM:

Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree.

This program can be taken entirely through the Center for Online and Virtual Education (COVE), which provides video-streamed versions of classes over the Internet. More information about this program can be found at <http://www.cecs.ucf.edu/COVE/> or (407) 823-3814.

The Industrial Engineering MSIE degree requires an undergraduate degree in Industrial Engineering or any other Engineering degree. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisites. The program offers both thesis and nonthesis options with each requiring 30 credit hours of courses. At least half of the regular coursework must be at the 6000 level. A cumulative grade-point average of B must be maintained in the entire program of study.

Thesis Option:

The thesis option requires 12 credit hours of required courses, 12 credit hours of electives and 6 thesis credit hours. Students must also write and successfully defend a thesis.

Nonthesis Option:

The nonthesis option requires 12 credit hours of required courses and 18 credit hours of electives. Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

A program of study must be developed with the graduate program director and meet with departmental approval. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be at the 6000 level or higher. Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters. A program of study must be developed with the graduate program director and meet with departmental approval. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be at the 6000 level or higher.

Prerequisites

Students with undergraduate degrees in industrial engineering or other engineering degrees are encouraged to apply for admission. Graduates from non-engineering curricula may apply to obtain the MS degree. It is expected that applicants to this program have the following prerequisites:

- Computer programming capability. Proficiency with MS Office expected. C++, Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312 or equivalent)
- Undergraduate Probability and Statistics for Engineers (STA 3032 or equivalent)

Required Courses: 12 Credit Hours

- ESI 6551 - Systems Architecting **3 Credit Hours**
- ESI 6224 - Quality Management **3 Credit Hours**
- ESI 6247 - Experimental Design and Taguchi Methods **3 Credit Hours**

Select one of the following courses:

- ESI 5306 - Operations Research **3 Credit Hours**
- ESI 6418 - Linear Programming and Extensions **3 Credit Hours**

Elective Courses: 12 Credit Hours

All students, both thesis and nonthesis, must take 12 credit hours of electives after consultation with their adviser.

Thesis Option: 6 Credit Hours

The thesis option requires an additional 6 credit hours of thesis. Thesis students must complete an independent research project and write and successfully defend a thesis describing the project. Students may not register for thesis credit hours until an advisory committee has been appointed and the committee has reviewed the program of study and the proposed thesis topic.

The College of Engineering and Computer Science requires that all thesis defense announcements are approved by the student's adviser and posted on the college's website (<http://www.cecs.ucf.edu/graddefense/>) and on the College of Graduate Studies [Events Calendar](#) at least two weeks before the defense date.

- EIN 6971 Thesis **6 Credit Hours**

Nonthesis Option: 6 Credit Hours

The nonthesis option requires a capstone course and an additional unrestricted elective course that supports the student's area of research and study interests. The capstone course should be completed toward the end of the student's graduate plan of study. As part of the requirements of this courses, students will complete an independent capstone project on a topic relevant to the industrial and systems engineering field and approved by the instructor. Students are expected to use and leverage knowledge obtained in the program to complete the project. This course serves as the culminating experience for students and shows their engagement in independent learning.

- EIN 6950 - Industrial and Systems Engineering Capstone **3 Credit Hours**
- Elective course **3 Credit Hours**

IEMS ELECTIVES

The program requirements are flexible enough to allow the students to tailor the coursework according to their desired educational and career goals. With the approval of their adviser and/or the graduate program director, students may select from the following groups of courses to satisfy the needs of their research goals or career objectives. To assist the students in achieving these goals and objectives, courses are grouped below to suggest focus areas, only as a guide to assist in advising and course selection. They are not intended to restrict elective choices among specialization areas as the intent of the program is to help graduate students maintain an integrated approach to their studies. The listing of these courses does not guarantee that they will be offered by the department in a particular year or semester.

In addition to the courses listed below, students may be allowed to take courses from the following disciplines, with the approval of the Graduate program Director, as an elective in their Graduate Program of Study:

- Other Engineering Programs
- Computer Science
- Mathematics and Statistics
- Business Administration/Management

Group A: Human System Engineering/Ergonomics

- EIN 5248 Ergonomics
- EIN 5251 Usability Engineering
- EIN 6270C Work Physiology
- EIN 6279C Biomechanics
- EIN 6935 Advanced Ergonomics Topics
- EIN 6271 Human Reliability

Group B: Quality and Production Systems

- ESI 6225 Quality Design and Control
- ESI 6224 Quality Management
- EIN 6336 Production and Inventory Systems
- EIN 6425 Scheduling and Sequencing
- EIN 5356 Cost Engineering
- ESI 5227 Total Quality Improvement
- ESI 5236 Reliability Engineering

Group C: Management Systems

- EIN 6182 Engineering Management
- EIN 5117 Management Information Systems I
- EIN 5140 Project Engineering
- EIN 6370 Innovation in Engineering Design
- EIN 6357 Advanced Engineering Economic Analysis
- EIN 6326 - Technology Strategy
- EIN 6339 Operations Engineering
- EIN 5108 The Environment of Technical Organizations

Group D: Simulation, Optimization, and Modeling

- ESI 6336 Queuing Systems
- ESI 5306 Operations Research
- ESI 6418 Linear Programming and Extensions
- ESI 6532 Object-Oriented Simulation
- ESI 5531 Discrete System Simulation
- EIN 5255C Interactive Simulation

- EIN 6645 Real-Time Simulation Agents
- EIN 6936 Seminar in Advanced Industrial Engineering
- ESI 5419C Engineering Applications of Linear and Nonlinear Optimization
- ESI 6217 Statistical Aspects of Digital Simulation
- ESI 6529 Advanced Systems Simulation
- ESI 6921 Seminar in Advanced Operations Research

Group E: Industrial and Systems Engineering

- ESI 5219 Engineering Statistics
- ESI 6358 Decision Analysis
- ESI 5359 Risk Assessment and Management
- EIN 6215 Systems Safety Engineering and Management
- EIN 5346 Engineering Logistics
- EIN 6936 Seminar in Advanced Industrial Engineering
- EIN 6950 Industrial and Systems Engineering Capstone
- ESI 6551 Systems Architecting
- ESI 6609 Industrial Engineering Analytics for Healthcare
- ESI 7480 Optimization and Data Mining for Industrial Engineers

THESIS REQUIREMENTS: For Students Electing Thesis Option Only.

This section is taken from the Graduate Catalog

The thesis is the culminating or comprehensive experience for those who conduct an original research study as part of a thesis-option program. The thesis consists of a common theme with an introduction and literature review, details of the study, and results and conclusions. Since the work is original, it is very important that care is taken in properly citing ideas and quotations of others. Academic dishonesty in thesis, research report and dissertation work may result in termination from the degree program.

An oral defense of the thesis is required. The approved thesis must be written and prepared in accordance with program, college, and university requirements. Thesis and Dissertation (ETD) describes university requirements and formatting instructions for theses and outlines the steps that graduate students must follow in order to submit their theses electronically to the UCF College of Graduate Studies.

Additionally, the Thesis and Dissertation Office offers workshops to inform graduate students about procedures, deadlines, and requirements associated with preparing a thesis.

Thesis students are required to submit their thesis electronically. [Thesis/dissertation \(ETD\)](#) submissions are archived by the UCF library in digital format that is widely accessible. The electronic thesis may include video and audio clips as well as other formats that are appropriate for the field of study.

All theses that use research involving human subjects, including surveys, must obtain approval from an independent board, the Institutional Review Board (IRB) prior to starting the research. Graduate students and the faculty that supervise them are required to attend training on IRB policies, so this

needs to start well in advance of the research start date. It is imperative that proper procedures are followed when using human subjects in research projects. Information about this process can be obtained from the [Office of Research and Commercialization](#). Click on "Compliance" and the IRB Policy and Procedures Manual is available. In addition, should the nature of the research or the faculty supervision change since the IRB approval was obtained, then new IRB approval must be sought. Failure to obtain this prior approval could jeopardize receipt of the student's degree.

Students who wish to complete their degree requirements in a given semester must take their oral defense and submit their final electronic copy to the UCF College of Graduate Studies by the dates shown in the [Academic Calendar](#).

Thesis Advisory Committee Membership

A student writing a thesis must have a Thesis Advisory Committee consisting of at least three members who are approved members of the Graduate Faculty or Graduate Faculty Scholars ([Graduate Faculty](#)). This committee will recommend to the Dean of the college regarding the student's program of study, provide continual guidance for the student, and be the principal mechanism for the evaluation of the student's thesis and performance in any general examinations. At least two members of the Thesis Advisory Committee must be Graduate Faculty, one of whom must serve as the chair of the committee. Graduate Faculty Scholars may serve as a member or co-chair of a thesis advisory committee but may not serve as the chair.

Program areas may specify additional committee membership beyond the minimum of three. These committee members must also be approved members of the Graduate Faculty or Graduate Faculty Scholars. Graduate Faculty members must form the majority of any given committee. Additional information regarding the criteria for serving as a member, co-chair, or chair of a Thesis Advisory Committee is provided in the updated [Graduate Policy Guide](#).

Committee membership must be approved by the program director and submitted to the College of Graduate Studies. All members must be in fields related to the thesis topic. The UCF College of Graduate Studies reserves the right to review appointments to a Thesis Advisory Committee, place a representative on any Thesis Advisory Committee, or appoint a co-chair. A student may request a change in membership of the Thesis Advisory Committee with the approval of the program director and re-submission to the College of Graduate Studies.

All committee members vote on acceptance or rejection of the final thesis. The thesis proposal and final thesis must be approved by a majority of the committee.

Thesis Enrollment Requirement

After completion of other course requirements, master's level students may be considered full-time if they enroll in at least three credit hours of thesis (EIN 6971). They subsequently must enroll in three thesis hours each semester continuously (including summers) until successful completion and defense. Students who need to interrupt their thesis work for extenuating circumstances must submit a Leave of Absence Form to the College of Graduate Studies. Submission and approval of the form must be obtained prior to the first day of classes for the term of non-enrollment.

Thesis Defense

Thesis defenses will be approved by a majority vote of the Thesis Advisory Committee. Thesis committee members who do not approve of the thesis may choose not to sign the thesis approval sheet. Further approval is required from the Dean or Dean designee and the UCF College of Graduate Studies before final acceptance of the thesis in fulfilling degree requirements.

EQUIPMENT FEE

Full-time students in the Industrial Engineering MSIE program pay a \$90 equipment fee each semester that they are enrolled. Part-time students pay \$45 each semester that they are enrolled.

INDEPENDENT LEARNING

A research project serves as the independent learning experience for thesis students. Nonthesis students are required to complete the department's capstone course toward the end of their program.

APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the [Admissions](#) section of the Graduate Catalog. Applicants must [apply online](#). All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science strongly encourages prospective applicants to request a free pre-screening submission (www.cecs.ucf.edu/prescreen) of their qualifications prior to submitting an online application for graduate admission. However, a pre-screening is not required; rather, it is offered as a courtesy to all prospective applicants before they commit to submitting a complete online application and paying an application processing fee.

Admissions decisions are made on the basis of a complete online application only, and not on the basis of any pre-screening. Prospective applicants who are encouraged to apply to their intended graduate program based on the information provided for their pre-screening are not assured of admission or financial assistance when they submit a complete online application. Although it is possible, it is not likely, that prospective applicants who are discouraged from formally applying to a graduate program at the pre-screening stage will be admitted if they elect to submit a complete online application anyway.

In addition to the [general UCF graduate application requirement](#), applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended
- Résumé or Curriculum Vita
- Goal statement

- The goal statement should discuss all relevant professional background and any previous research and/or teaching experience. The statement should explain the motivation behind the pursuit of a Master's degree in Industrial Engineering. Future educational and career goals after the completion of the applicant's master study should be discussed.
- If the applicant is interested in completing a Master thesis, then the applicant must clearly describe the particular area of research interest. The applicant should identify at least one UCF faculty member who shares a similar research focus and is believed to be best suited to serve as a potential thesis advisor.
- The goal statement should be between 500 and 1,000 words.
- Two letters of recommendation
 - The letters of recommendation should be from faculty members, university administrators and employers with a supervisory role of the applicant. The letters, which must be current to the application and must not be for another degree program, should address the educational and career goals of applicant. The letter writers should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program. Letters for Master's thesis students must discuss the applicant's ability to perform graduate-level research.
 - Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from [World Education Services \(WES\)](#) or [Josef Silny and Associates, Inc.](#) only.

Applications are accepted for the fall and spring terms only.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Master of Science in Engineering Management (MSEM)

PROGRAM DESCRIPTION:

The Master of Science in Engineering Management (MSEM) degree in Industrial Engineering focuses on effective decision-making in engineering and technological organizations. The Professional Engineering Management (PEM) track is designated a Professional Science Master's (PSM) degree.

PROGRAM CURRICULUM:

Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree.

This program can be taken entirely through the Center for Online and Virtual Education (COVE), which provides video-streamed versions of classes over the Internet. More information about this program can be found at <http://www.cecs.ucf.edu/COVE/> or (407) 823-3814.

The Engineering Management MSEM degree requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisites. An approved program of study must be developed in consultation with the graduate program director. The total number of hours is 30 credit hours.

Prerequisites

Mathematics through Calculus II (MAP 2312)

Required Courses—9 Credit Hours

- EIN 5140 - Project Engineering 3 Credit Hours
- ESI 6551 - Systems Architecting 3 Credit Hours
- EIN 6357 - Advanced Engineering Economic Analysis 3 Credit Hours

Concentration Courses—9 Credit Hours

- EIN 5108 - The Environment of Technical Organizations 3 Credit Hours
- EIN 6370 - Innovation in Engineering Design 3 Credit Hours
- EIN 6182 - Engineering Management 3 Credit Hours

Capstone Required Course—3 Credit Hours (For Non-Thesis Only Option)

- EIN 6950 - Industrial and Systems Engineering Capstone 3 Credit Hours

Thesis Option—12 Credit Hours

Thesis students must complete an independent research project and then write and successfully defend their thesis. Furthermore, an additional 6 credit hours of electives are required beyond the 18 credit hours of required courses described above.

- EIN 6971 - Thesis **6 Credit Hours**
- Elective **6 Credit Hours**

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of electives beyond the 21 credit hours of required courses described above.

The nonthesis option requires a capstone course. The capstone course should be completed toward the end of the student's graduate plan of study. As part of the requirements of this courses, the student will complete an independent capstone project on a topic relevant to the industrial and systems engineering field and approved by the instructor. Students are expected to use and leverage knowledge obtained in the program to complete the project. This course serves as the culminating experience for students and shows their engagement in independent learning.

IEMS ELECTIVES

The program requirements are flexible enough to allow the students to tailor the coursework according to their desired educational and career goals. With the approval of their adviser and/or the graduate program director, students may select from the following groups of courses to satisfy the needs of their research goals or career objectives. To assist the students in achieving these goals and objectives, courses are grouped below to suggest focus areas, only as a guide to assist in advising and course selection. They are not intended to restrict elective choices among specialization areas as the intent of the program is to help graduate students maintain an integrated approach to their studies. The listing of these courses does not guarantee that they will be offered by the department in a particular year or semester.

In addition to the courses listed below, students may be allowed to take courses from the following disciplines, with the approval of the Graduate program Director, as an elective in their Graduate Program of Study:

- Other Engineering Programs
- Computer Science
- Mathematics and Statistics
- Business Administration/Management

Group A: Human System Engineering/Ergonomics

- EIN 5248 Ergonomics
- EIN 5251 Usability Engineering
- EIN 6270C Work Physiology
- EIN 6279C Biomechanics
- EIN 6935 Advanced Ergonomics Topics
- EIN 6271 Human Reliability

Group B: Quality and Production Systems

- ESI 6225 Quality Design and Control
- ESI 6224 Quality Management
- EIN 6336 Production and Inventory Systems
- EIN 6425 Scheduling and Sequencing
- EIN 5356 Cost Engineering
- ESI 5227 Total Quality Improvement
- ESI 5236 Reliability Engineering

Group C: Management Systems

- EIN 6182 Engineering Management
- EIN 5117 Management Information Systems I
- EIN 5140 Project Engineering
- EIN 6370 Innovation in Engineering Design
- EIN 6357 Advanced Engineering Economic Analysis
- EIN 6326 - Technology Strategy
- EIN 6339 Operations Engineering
- EIN 5108 The Environment of Technical Organizations

Group D: Simulation, Optimization, and Modeling

- ESI 6336 Queuing Systems
- ESI 5306 Operations Research
- ESI 6418 Linear Programming and Extensions
- ESI 6532 Object-Oriented Simulation
- ESI 5531 Discrete System Simulation
- EIN 5255C Interactive Simulation
- EIN 6645 Real-Time Simulation Agents
- EIN 6936 Seminar in Advanced Industrial Engineering
- ESI 5419C Engineering Applications of Linear and Nonlinear Optimization
- ESI 6217 Statistical Aspects of Digital Simulation
- ESI 6529 Advanced Systems Simulation
- ESI 6921 Seminar in Advanced Operations Research

Group E: Industrial and Systems Engineering

- ESI 5219 Engineering Statistics
- ESI 6358 Decision Analysis
- ESI 5359 Risk Assessment and Management
- EIN 6215 Systems Safety Engineering and Management
- EIN 5346 Engineering Logistics
- EIN 6936 Seminar in Advanced Industrial Engineering
- EIN 6950 Industrial and Systems Engineering Capstone
- ESI 6551 Systems Architecting

- ESI 6609 Industrial Engineering Analytics for Healthcare
- ESI 7480 Optimization and Data Mining for Industrial Engineers

THESIS REQUIREMENTS: For Students Electing Thesis Option Only.

This section is taken from the Graduate Catalog

The thesis is the culminating or comprehensive experience for those who conduct an original research study as part of a thesis-option program. The thesis consists of a common theme with an introduction and literature review, details of the study, and results and conclusions. Since the work is original, it is very important that care is taken in properly citing ideas and quotations of others. Academic dishonesty in thesis, research report and dissertation work may result in termination from the degree program.

An oral defense of the thesis is required. The approved thesis must be written and prepared in accordance with program, college, and university requirements. Thesis and Dissertation (ETD) describes university requirements and formatting instructions for theses and outlines the steps that graduate students must follow in order to submit their theses electronically to the UCF College of Graduate Studies.

Additionally, the Thesis and Dissertation Office offers workshops to inform graduate students about procedures, deadlines, and requirements associated with preparing a thesis.

Thesis students are required to submit their thesis electronically. [Thesis/dissertation \(ETD\)](#) submissions are archived by the UCF library in digital format that is widely accessible. The electronic thesis may include video and audio clips as well as other formats that are appropriate for the field of study.

All theses that use research involving human subjects, including surveys, must obtain approval from an independent board, the Institutional Review Board (IRB) prior to starting the research. Graduate students and the faculty that supervise them are required to attend training on IRB policies, so this needs to start well in advance of the research start date. It is imperative that proper procedures are followed when using human subjects in research projects. Information about this process can be obtained from the [Office of Research and Commercialization](#). Click on "Compliance" and the IRB Policy and Procedures Manual is available. In addition, should the nature of the research or the faculty supervision change since the IRB approval was obtained, then new IRB approval must be sought. Failure to obtain this prior approval could jeopardize receipt of the student's degree.

Students who wish to complete their degree requirements in a given semester must take their oral defense and submit their final electronic copy to the UCF College of Graduate Studies by the dates shown in the [Academic Calendar](#).

Thesis Advisory Committee Membership

A student writing a thesis must have a Thesis Advisory Committee consisting of at least three members who are approved members of the Graduate Faculty or Graduate Faculty Scholars ([Graduate Faculty](#)). This committee will recommend to the Dean of the college regarding the student's program of study, provide continual guidance for the student, and be the principal

mechanism for the evaluation of the student's thesis and performance in any general examinations. At least two members of the Thesis Advisory Committee must be Graduate Faculty, one of whom must serve as the chair of the committee. Graduate Faculty Scholars may serve as a member or co-chair of a thesis advisory committee but may not serve as the chair.

Program areas may specify additional committee membership beyond the minimum of three. These committee members must also be approved members of the Graduate Faculty or Graduate Faculty Scholars. Graduate Faculty members must form the majority of any given committee. Additional information regarding the criteria for serving as a member, co-chair, or chair of a Thesis Advisory Committee is provided in the updated [Graduate Policy Guide](#).

Committee membership must be approved by the program director and submitted to the College of Graduate Studies. All members must be in fields related to the thesis topic. The UCF College of Graduate Studies reserves the right to review appointments to a Thesis Advisory Committee, place a representative on any Thesis Advisory Committee, or appoint a co-chair. A student may request a change in membership of the Thesis Advisory Committee with the approval of the program director and re-submission to the College of Graduate Studies.

All committee members vote on acceptance or rejection of the final thesis. The thesis proposal and final thesis must be approved by a majority of the committee.

Thesis Enrollment Requirement

After completion of other course requirements, master's level students may be considered full-time if they enroll in at least three credit hours of thesis (EIN 6971). They subsequently must enroll in three thesis hours each semester continuously (including summers) until successful completion and defense. Students who need to interrupt their thesis work for extenuating circumstances must submit a Leave of Absence Form to the College of Graduate Studies. Submission and approval of the form must be obtained prior to the first day of classes for the term of non-enrollment.

Thesis Defense

Thesis defenses will be approved by a majority vote of the Thesis Advisory Committee. Thesis committee members who do not approve of the thesis may choose not to sign the thesis approval sheet. Further approval is required from the Dean or Dean designee and the UCF College of Graduate Studies before final acceptance of the thesis in fulfilling degree requirements.

Equipment Fee

Students in the Engineering Management MSEM program pay a \$90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is \$45 per semester.

Independent Learning

A research project serves as the independent learning experience for thesis students. Nonthesis students are required to complete the department's capstone course toward the end of their program.

APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the [Admissions](#) section of the Graduate Catalog. Applicants must [apply online](#). All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended
- Résumé or Curriculum Vita
- Goal statement
 - The goal statement should discuss all relevant professional background and any previous research and/or teaching experience. The statement should explain the motivation behind the pursuit of a Master's degree in Industrial Engineering. Future educational and career goals after the completion of the applicant's master study should be discussed.
 - If the applicant is interested in completing a Master thesis, then the applicant must clearly describe the particular area of research interest. The applicant should identify at least one UCF faculty member who shares a similar research focus and is believed to be best suited to serve as a potential thesis advisor.
 - The goal statement should be between 500 and 1,000 words.
- Two letters of recommendation
 - The letters of recommendation should be from faculty members, university administrators and employers with a supervisory role of the applicant. The letters, which must be current to the application and must not be for another degree program, should address the educational and career goals of applicant. The letter writers should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program. Letters for Master's thesis students must discuss the applicant's ability to perform graduate-level research.
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.
- Applications are accepted for the fall and spring terms only.

Master of Science (MS)

PROGRAM DESCRIPTION:

The Master of Science programs in Industrial Engineering are designed to produce highly skilled graduates who are prepared to be industrial engineers, engineering managers or technical professionals, or leaders for the global economy, as well as preparing them for further graduate work or independent research.

Industrial Engineering, in its broad nature, focuses on the design and improvement of systems, products and processes. A total systems approach is used to optimize the various aspects of operations in both manufacturing and service industries. Industrial engineers use many analytical approaches to improve productivity, safety, and quality of working life while reducing operating costs.

The Industrial Engineering programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

In the Industrial Engineering MS programs, students are able to individually craft their programs of study and select their courses to focus in one or more of the following research areas:

Human Systems Engineering/Ergonomics

As technology has become more sophisticated, the need to design for the human user has become more difficult, yet even more important. Human engineering and ergonomics assist in ensuring that as technology advances, the abilities, limitations, and needs of humans are considered in the system design. This not only supports the needs of the user, it also optimizes the efficiency and usability of the system designed. Traditionally, ergonomics has been associated with biomechanical issues and work measurement and performance issues in physical system design, as well as occupational and industrial safety. The broader focus of human engineering encompasses those issues as well as incorporating the reaction and effectiveness of human interaction with systems, both physical systems and virtual systems such as computer-based models.

Research in the Human Systems Engineering and Ergonomics area provides students with the necessary knowledge in human engineering and ergonomics to effectively design tasks, industrial systems, and work environments that maximize human performance, safety, and overall productivity.

Interactive Simulation and Training Systems

The Interactive Simulation and Training Systems research within the Industrial Engineering MS program focuses on providing a fundamental understanding of significant topics relative to simulation systems and the requirements, design, development, and use of such systems for knowledge transfer in the technical environment. Courses in this area address the evolving and multiple discipline application of interactive simulation by providing a wealth of electives to support development of individual student interests and talents. In conjunction with UCF's Institute for Simulation and Training, industrial organizations involved in simulation in the Central Florida region,

military organizations, and other governmental organizations, ISTS research in the MS program provides exposure to both military and commercial interactive simulation and training systems.

The emphasis is on the application and development of interactive simulation and training systems to meet various requirements including, but not limited to: simulators, skill trainers, organizational learning systems, computer and web-based interactive simulation systems and other novel interactive simulation efforts. Courses in the interactive simulation and training systems area prepare individuals with an undergraduate degree in engineering, science, education, psychology, mathematics or other related disciplines for careers in simulation, focusing particularly on the interactive simulation and training systems industries.

Operations Research

The Operations Research courses in the Industrial Engineering MS program uses mathematics and computer-based systems to model operational processes and decisions in order to develop and evaluate alternatives that will lead to gains in efficiency and effectiveness. Drawing on probability, statistics, simulation, optimization, and stochastic processes, Operations Research provides many of the analytic tools used by industrial engineers as well as by other analysts to improve processes, decision-making, and management by individuals and organizations. Research in this area is ideal for students who have an undergraduate degree in engineering, mathematics, or science. The knowledge in these courses build on an undergraduate Engineering, Mathematics, or Science degree to develop a strong modeling and analytical capability to improve processes and decision-making.

Quality Systems Engineering

The Quality Systems Engineering research in the Industrial Engineering MS program focuses on providing the knowledge for improving product and process quality in manufacturing and service industries. Quality Systems Engineering provides both the quantitative tools for measuring quality and the managerial focus and organizational insight required to implement effective continuous improvement programs and incorporate the voice of the customer. The Quality Systems Engineering courses builds on an undergraduate degree in industrial engineering or a closely related discipline to provide the necessary knowledge to plan, control, and improve the product assurance function in government, military, service, or manufacturing organizations.

Simulation Modeling and Analysis

The Simulation Modeling and Analysis research and studies in the Industrial Engineering MS program focus on providing a fundamental understanding of the functional and technical design requirements for simulation in manufacturing and service industries. Research in this area is based on a systems modeling paradigm and provides coding and development capability in the context of a broader systems framework. Significant exposure to design and analysis aspects is a core element of the track. The Simulation Modeling and Analysis research and coursework prepare individuals with an undergraduate degree in Engineering, Science, Mathematics, or a closely related discipline for careers in simulation, focusing particularly on using simulation as an analysis and design tool for the manufacturing and service industries.

Systems Engineering

Intelligence is being infused into everyday systems, processes and infrastructure that enable physical goods to be developed, manufactured, bought and sold. These same systems also facilitate the movement and delivery of global products and services that support worldwide markets such as finance, energy resources and healthcare systems.

With these technological advancements, comes a new level of complexity as organizations struggle to integrate systems, processes and data feeds. As a result, the demand for systems engineering and related skills is expected to grow significantly.

Systems engineers design and implement computer systems, software and networks, including defining complex system requirements, and determining system specifications, processes and working parameters.

The Systems Engineering studies and research in the Industrial Engineering MS program are intended for individuals of all engineering disciplines. Research and coursework focus on a systems view of engineering problems related to the management of complex industrial, military, government, and social systems.

International students (F or J visa) are required to enroll in a full-time course load of 9 credit hours during the fall and spring semesters. Only 3 of the 9 credit hours may be taken in a completely online format. For a detailed listing of enrollment requirements for international students, please visit www.intl.ucf.edu. If you have any questions, please consult the International Services Center at 407-823-2337.

PROGRAM CURRICULUM:

Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree.

This program can be taken entirely through the Center for Online and Virtual Education (COVE), which provides video-streamed versions of classes over the Internet. More information about this program can be found at <http://www.cecs.ucf.edu/COVE/> or (407) 823-3814.

The Industrial Engineering MS program offers both thesis and nonthesis options with each requiring 30 credit hours of courses. The program is flexible to enable students to model their plan of study to suit their needs and future work or career goals. All students must develop a plan of study with the graduate program director that meets with departmental approval. At least one-half of the courses (including thesis hours) required in the master's program of study must be at the 6000 level or higher. A cumulative grade-point average of B (3.0) must be maintained in the entire program of study.

Students on assistantships must take 9 credit hours per semester (Fall, Spring) to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students

with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

Prerequisites

The Industrial Engineering MS program requires an undergraduate degree in engineering, mathematics, computer science, statistics, physics, quantitative management or similar field.

Outstanding students with degrees in other disciplines such as business, economics or computer/information sciences may also be considered on a case-by-case basis, provided they have significant work experience and/or very high academic standing.

Regardless of the undergraduate degree, all applicants must have completed the following prerequisites:

- Mathematics through Calculus II (MAC 2312 or equivalent)
- An undergraduate course in engineering probability and statistics.
- In addition, they are expected to be familiar with at least one programming language (such as C, FORTRAN, Java, Visual BASIC, C++, etc.) and common computer skills and tools such as word processors and spreadsheets.

Required Courses—12 Credit Hours

- ESI 5219 Engineering Statistics (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- ESI 6551 Systems Architecting (3 credit hours)

Elective Courses—12 Credit Hours

All students, both thesis and nonthesis, must take 12 credit hours of electives after consultation with their adviser.

Thesis Option—6 Credit Hours

The thesis option requires 6 credit hours of thesis. Thesis students must complete an independent research study and write and successfully defend a thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements are approved by the student's adviser and posted on the college's website

(<http://www.cecs.ucf.edu/graddefense/>) and on the College of Graduate Studies [Events Calendar](#) at least two weeks before the defense date.

Nonthesis Option—6 Credit Hours

- EIN 6950 Capstone Course in Industrial and Systems Engineering (3 credit hours)
- Elective course (3 credit hours)

The nonthesis option requires a capstone course and an additional nonrestricted elective course that supports the student's area of research and study interests. The capstone course should be completed toward the end of the student's graduate plan of study. As part of the requirements of this course, students will complete an independent capstone project on a topic relevant to the industrial and systems engineering field and approved by the instructor. Students are expected to use and leverage knowledge obtained in the program to complete the project. This course serves as the culminating experience for the students and shows their engagement in independent learning.

IEMS ELECTIVES

The program requirements are flexible enough to allow the students to tailor the coursework according to their desired educational and career goals. With the approval of their adviser and/or the graduate program director, students may select from the following groups of courses to satisfy the needs of their research goals or career objectives. To assist the students in achieving these goals and objectives, courses are grouped below to suggest focus areas, only as a guide to assist in advising and course selection. They are not intended to restrict elective choices among specialization areas as the intent of the program is to help graduate students maintain an integrated approach to their studies. The listing of these courses does not guarantee that they will be offered by the department in a particular year or semester.

In addition to the courses listed below, students may be allowed to take courses from the following disciplines, with the approval of the Graduate program Director, as an elective in their Graduate Program of Study:

- Other Engineering Programs
- Computer Science
- Mathematics and Statistics
- Business Administration/Management

Group A: Human System Engineering/Ergonomics

- EIN 5248 Ergonomics
- EIN 5251 Usability Engineering
- EIN 6270C Work Physiology
- EIN 6279C Biomechanics
- EIN 6935 Advanced Ergonomics Topics
- EIN 6271 Human Reliability

Group B: Quality and Production Systems

- ESI 6225 Quality Design and Control
- ESI 6224 Quality Management
- EIN 6336 Production and Inventory Systems
- EIN 6425 Scheduling and Sequencing
- EIN 5356 Cost Engineering
- ESI 5227 Total Quality Improvement
- ESI 5236 Reliability Engineering

Group C: Management Systems

- EIN 6182 Engineering Management
- EIN 5117 Management Information Systems I
- EIN 5140 Project Engineering
- EIN 6370 Innovation in Engineering Design
- EIN 6357 Advanced Engineering Economic Analysis
- EIN 6326 - Technology Strategy
- EIN 6339 Operations Engineering
- EIN 5108 The Environment of Technical Organizations

Group D: Simulation, Optimization, and Modeling

- ESI 6336 Queuing Systems
- ESI 5306 Operations Research
- ESI 6418 Linear Programming and Extensions
- ESI 6532 Object-Oriented Simulation
- ESI 5531 Discrete System Simulation
- EIN 5255C Interactive Simulation
- EIN 6645 Real-Time Simulation Agents
- EIN 6936 Seminar in Advanced Industrial Engineering
- ESI 5419C Engineering Applications of Linear and Nonlinear Optimization
- ESI 6217 Statistical Aspects of Digital Simulation
- ESI 6529 Advanced Systems Simulation
- ESI 6921 Seminar in Advanced Operations Research

Group E: Industrial and Systems Engineering

- ESI 5219 Engineering Statistics
- ESI 6358 Decision Analysis
- ESI 5359 Risk Assessment and Management
- EIN 6215 Systems Safety Engineering and Management
- EIN 5346 Engineering Logistics
- EIN 6936 Seminar in Advanced Industrial Engineering
- EIN 6950 Industrial and Systems Engineering Capstone
- ESI 6551 Systems Architecting

- ESI 6609 Industrial Engineering Analytics for Healthcare
- ESI 7480 Optimization and Data Mining for Industrial Engineers

THESIS REQUIREMENTS: For Students Electing Thesis Option Only.

This section is taken from the Graduate Catalog

The thesis is the culminating or comprehensive experience for those who conduct an original research study as part of a thesis-option program. The thesis consists of a common theme with an introduction and literature review, details of the study, and results and conclusions. Since the work is original, it is very important that care is taken in properly citing ideas and quotations of others. Academic dishonesty in thesis, research report and dissertation work may result in termination from the degree program.

An oral defense of the thesis is required. The approved thesis must be written and prepared in accordance with program, college, and university requirements. Thesis and Dissertation (ETD) describes university requirements and formatting instructions for theses and outlines the steps that graduate students must follow in order to submit their theses electronically to the UCF College of Graduate Studies.

Additionally, the Thesis and Dissertation Office offers workshops to inform graduate students about procedures, deadlines, and requirements associated with preparing a thesis.

Thesis students are required to submit their thesis electronically. [Thesis/dissertation \(ETD\)](#) submissions are archived by the UCF library in digital format that is widely accessible. The electronic thesis may include video and audio clips as well as other formats that are appropriate for the field of study.

All theses that use research involving human subjects, including surveys, must obtain approval from an independent board, the Institutional Review Board (IRB) prior to starting the research. Graduate students and the faculty that supervise them are required to attend training on IRB policies, so this needs to start well in advance of the research start date. It is imperative that proper procedures are followed when using human subjects in research projects. Information about this process can be obtained from the [Office of Research and Commercialization](#). Click on "Compliance" and the IRB Policy and Procedures Manual is available. In addition, should the nature of the research or the faculty supervision change since the IRB approval was obtained, then new IRB approval must be sought. Failure to obtain this prior approval could jeopardize receipt of the student's degree.

Students who wish to complete their degree requirements in a given semester must take their oral defense and submit their final electronic copy to the UCF College of Graduate Studies by the dates shown in the [Academic Calendar](#).

Thesis Advisory Committee Membership

A student writing a thesis must have a Thesis Advisory Committee consisting of at least three members who are approved members of the Graduate Faculty or Graduate Faculty Scholars ([Graduate Faculty](#)). This committee will recommend to the Dean of the college regarding the student's program of study, provide continual guidance for the student, and be the principal

mechanism for the evaluation of the student's thesis and performance in any general examinations. At least two members of the Thesis Advisory Committee must be Graduate Faculty, one of whom must serve as the chair of the committee. Graduate Faculty Scholars may serve as a member or co-chair of a thesis advisory committee but may not serve as the chair.

Program areas may specify additional committee membership beyond the minimum of three. These committee members must also be approved members of the Graduate Faculty or Graduate Faculty Scholars. Graduate Faculty members must form the majority of any given committee. Additional information regarding the criteria for serving as a member, co-chair, or chair of a Thesis Advisory Committee is provided in the updated [Graduate Policy Guide](#).

Committee membership must be approved by the program director and submitted to the College of Graduate Studies. All members must be in fields related to the thesis topic. The UCF College of Graduate Studies reserves the right to review appointments to a Thesis Advisory Committee, place a representative on any Thesis Advisory Committee, or appoint a co-chair. A student may request a change in membership of the Thesis Advisory Committee with the approval of the program director and re-submission to the College of Graduate Studies.

All committee members vote on acceptance or rejection of the final thesis. The thesis proposal and final thesis must be approved by a majority of the committee.

Thesis Enrollment Requirement

After completion of other course requirements, master's level students may be considered full-time if they enroll in at least three credit hours of thesis (EIN 6971). They subsequently must enroll in three thesis hours each semester continuously (including summers) until successful completion and defense. Students who need to interrupt their thesis work for extenuating circumstances must submit a Leave of Absence Form to the College of Graduate Studies. Submission and approval of the form must be obtained prior to the first day of classes for the term of non-enrollment.

Thesis Defense

Thesis defenses will be approved by a majority vote of the Thesis Advisory Committee. Thesis committee members who do not approve of the thesis may choose not to sign the thesis approval sheet. Further approval is required from the Dean or Dean designee and the UCF College of Graduate Studies before final acceptance of the thesis in fulfilling degree requirements.

Equipment Fee

Students in the Engineering Management MSEM program pay a \$90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is \$45 per semester.

Independent Learning

A research project serves as the independent learning experience for thesis students. Nonthesis students are required to complete the department's capstone course toward the end of their program.

APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the [Admissions](#) section of the Graduate Catalog. Applicants must [apply online](#). All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science strongly encourages prospective applicants to request a free pre-screening (www.cecs.ucf.edu/prescreen) of their qualifications prior to submitting an online application for graduate admission. However, a pre-screening is not required; rather, it is offered as a courtesy to all prospective applicants before they commit to submitting a complete online application and paying an application processing fee.

Admissions decisions are made on the basis of a complete online application only, and not on the basis of any pre-screening. Prospective applicants who are encouraged to apply to their intended graduate program based on the information provided for their pre-screening are not assured of admission or financial assistance when they submit a complete online application. Although it is possible, it is not likely, that prospective applicants who are discouraged from formally applying to a graduate program at the pre-screening stage will be admitted if they elect to submit a complete online application anyway. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisites.

In addition to the [general UCF graduate application requirements](#), applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended
- Résumé or Curriculum Vita
- Goal statement
 - The goal statement should discuss all relevant professional background and any previous research and/or teaching experience. The statement should explain the motivation behind the pursuit of a Master's degree in Industrial Engineering. Future educational and career goals after the completion of the applicant's master study should be discussed.
 - If the applicant is interested in completing a Master thesis, then the applicant must clearly describe the particular area of research interest. The applicant should identify at least one UCF faculty member who shares a similar research focus and is believed to be best suited to serve as a potential thesis advisor.
 - The goal statement should be between 500 and 1,000 words.
- Two letters of recommendation
 - The letters of recommendation should be from faculty members, university administrators and employers with a supervisory role of the applicant. The letters, which must be current to the application and must not be for another degree program, should address the educational and career goals of applicant. The letter writers should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program. Letters for Master's thesis students must discuss the applicant's ability to perform graduate-level research.

- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from [World Education Services \(WES\)](#) or [Josef Silny and Associates, Inc.](#) only.

Applications are accepted for the fall and spring terms only.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Please note: Due to restrictive state regulations, UCF is not permitted to provide online courses or instruction to students in the following states. If you reside in one of these states, you may not be permitted to enroll in or be admitted to a UCF online program. Please contact your state's higher education regulation authorities or the UCF Graduate Program (see contact information above) for more details.

- Alabama
- Maryland
- Minnesota

FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see [Student Finances](#), which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The [Financial Information](#) section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see [Fellowships](#), which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

Graduate Assistantships

The Department of Industrial Engineering and Management Systems employs a number of graduate teaching assistants and researchers in order to aid students financially during their academic careers. IEMS holds potential graduate assistants to the same application requirements as all other University departments. Applicants can find this information in the [UCF Graduate Catalog](#) online, and for specific IEMS fellowships and assistantships please visit the IEMS website at www.iems.ucf.edu.

Graduate Teaching Assistant applicants who have English as their second language will be evaluated for the English-speaking skills by the Center for Multilingual Multicultural Studies, using the Versant Test. Students who have GTA assistantships must complete the university GTA Training requirements

before beginning their assignments. For more information, see [GTA Information](#) and the Financial Information section of the Graduate Catalog.

It is expected that graduate teaching assistants pursue research opportunities within two years of their employment as teaching assistants for the department. Employment as Graduate Teaching Assistants is limited to a maximum of two years.

Students employed as Graduate Assistants, Graduate Teaching Assistants, or in any other paid position serving the University of Central Florida are wholly responsible for assuring timely receipt of financial support. Within the Department of Industrial Engineering and Management Systems students must follow the pay periods established by the University. The duration of the student's financial support correlates with his or her status as either a student or student worker within IEMS; it is up to the discretion of the Department to determine the full duration of a student's financial support.

All international students attending the University of Central Florida are encouraged to apply for employment within the school. For information about the types of employment available to international students, and the requirements and restrictions based on visa type, see the International Services Center's website: www.intl.ucf.edu > Students > Employment.

GRADUATE RESEARCH

The University of Central Florida has strict guidelines for graduate students conducting research that involves human and animal subjects. All theses and dissertations that use research involving human subjects, including surveys, must obtain approval from an independent board, the Institutional Review Board (IRB), prior to starting the research. It is imperative that proper procedures are followed when using human subjects in research projects. Information about this process can be obtained from the Office of Research (www.research.ucf.edu). Failure to obtain this prior approval could jeopardize receipt of the student's degree.

All graduate students conducting research while attending the University of Central Florida must be familiar with the school's "Patent and Invention Policy." The full content of the Patent and Invention Policy is located online in the Graduate Catalog. The university has three fundamental responsibilities with regard to graduate student research:

1. Support an academic environment that stimulates the spirit of inquiry.
2. Develop the intellectual property stemming from research.
3. Disseminate the intellectual property to the general public.

The University of Central Florida owns the intellectual property developed using university resources. The graduate-student-as-inventor will, according to this policy, share in the proceeds of the invention.

GRADUATE STUDENT ASSOCIATION

The Graduate Student Association (GSA) is UCF's graduate organization committed to enrich graduate students' personal, educational and professional experience. To learn more or get involved,

please visit www.gsa.ucf.edu. For individual department or graduate program organizations, please see program advisor.

FACULTY RESEARCH

The Department of Industrial Engineering and Management Systems faculty members are all actively involved in research projects and collaborations in addition to their teaching responsibilities.

The following table represents current faculty research projects and interests.

DEPARTMENT OF INDUSTRIAL ENGINEERING AND MANAGEMENT SYSTEMS
GRADUATE OFFICE

FACULTY RESEARCH INTERESTS 2018 - 2019

FACULTY MEMBER	RESEARCH INTERESTS	ADDITIONAL REMARKS
RICHARD BIEHL	<ol style="list-style-type: none"> 1. Healthcare systems, data, & informatics 2. Quality management & engineering 3. Process maturity, capability, & standards 4. Social-scale systems & ecosystems 	
VLADIMIR BOGINSKI	<ol style="list-style-type: none"> 1. Network science and engineering 2. Operations research 3. Big data 4. Systems engineering 	
MARK CALABRESE	<ol style="list-style-type: none"> 1. Optimization 2. Business process reengineering 3. Quality systems and performance excellence 4. Financial management and systems 5. Strategic management and planning 6. Leadership 	
AHMAD ELSHENAWY	<ol style="list-style-type: none"> 1. Quality management and performance excellence 2. Lean six sigma applications in manufacturing, service and healthcare organizations 3. Business process reengineering 4. Manufacturing systems engineering 5. Lean 3P 	
IVAN GARIBAY	<ol style="list-style-type: none"> 1. Big data 2. Data analytics 3. Innovation, simulation, and agent-based models. 4. Complex systems, computational economics, evolutionary computation, complex adaptive systems, economic modeling, computational social sciences, game theory with particular focus on: <ol style="list-style-type: none"> i. innovation ecosystems computational analysis and modeling; ii. entrepreneurship education and innovation; 	

	<ul style="list-style-type: none"> iii. mathematical modeling and agent-based modeling of complex systems including co-adaptive systems, autonomous agents systems, multi-agents systems, and self-organizing systems. 	
ROBERT HOEKSTRA	<ul style="list-style-type: none"> 1. Creativity 2. Innovation 3. Product design 	
WALDEMAR KARWOWSKI	<ul style="list-style-type: none"> 1. Human-systems integration 2. Engineering management 3. Ergonomics and safety 4. Complex systems and chaos 5. Human performance: modeling and simulation 6. Neuroergonomics 	
HEATHER KEATHLEY	<ul style="list-style-type: none"> 1. Management systems engineering 2. Organizational change and transformation. 3. Implementation and function of management systems 4. Organizational performance measurement systems 5. Applications in the healthcare and defense sectors. 	
TIM KOTNOUR	<ul style="list-style-type: none"> 1. Strategic management 2. Strategic planning 3. Organizational transformations and change management 4. Program/project management. 	
GENE LEE	<ul style="list-style-type: none"> 1. Modeling & simulation 2. Ergonomics/human factors 3. An interoperability technology for LVC components 4. Biological and chemical Isolation suit for bio-terrorism response 5. Research on implementation Issues in multi-Resolution combat modeling 	
PAMELA MCCAULEY	<ul style="list-style-type: none"> 1. Human centric models for applying m-health Innovations in healthcare service delivery for developing nations 2. Human factors and ergonomics in disaster management 3. Fuzzy set theory based mathematical model development 4. Ergonomics/human factors and biomechanics 5. Engineering leadership & innovation 6. Leadership for women in STEM 	
MANSOOREH MOLLAGHASSEMI	<ul style="list-style-type: none"> 1. Modeling and simulation 2. Multicriteria optimization 3. Data analysis 	

<p>THOMAS O'NEAL</p>	<ol style="list-style-type: none"> 1. Strategic management 2. Technology management and commercialization 3. Engineering entrepreneurship 4. Innovation 	
<p>MICHAEL PROCTOR</p>	<ol style="list-style-type: none"> 1. Interactive simulation 2. Real time agents (virtual humans) 3. Intelligent tutoring 4. Synthetic natural environments 5. Simulation-based life cycle engineering 6. Advanced engineering & behavioral economics 	
<p>LUIS RABELO</p>	<ol style="list-style-type: none"> 1. Hybrid/enterprise simulation and agent-based simulation 2. Advanced engineering economics using advanced simulation 3. Leadership and change management using advanced simulation 4. Parallel discrete-event simulation 5. LVC simulation 	
<p>CHARLES REILLY</p>	<ol style="list-style-type: none"> 1. Random generation of synthetic optimization problems 2. Impact of entropy and coefficient correlation on the performance of exact and approximate optimization methods 3. Input models for bivariate and multivariate discrete random variables 4. Applications of operations research 	
<p>ADAN VELA</p>	<ol style="list-style-type: none"> 1. Modeling, optimization, control and simulation of stochastic dynamic systems 2. Machine learning and artificial intelligence 3. Big-data systems and predictive analytics 4. Air transportation systems 5. Unmanned aerial systems (UAS/UAV) 6. Human-in-the-loop control 	
<p>QIPENG ZHENG</p>	<ol style="list-style-type: none"> 1. Applied optimization and operations research 2. Stochastic programming 3. Network optimization 4. Energy and power systems, management and economics 5. Transportation planning and evacuation planning 6. Healthcare management 	

FORMS

Any or all of the following forms may be required by a student during their academic careers at IEMS. All forms listed below may be obtained on the IEMS website under the 'Forms' section or from Graduate Studies.

CECS Course Override Form

The course override form is primarily used in the following situations: an undergraduate student registering in a graduate level course, a graduate student registering in an undergraduate level course, overriding a class size limit, overriding pre-requisites, overriding scheduling time conflicts, and overriding maximum hour limits. Students will need to fill out this form if they are requesting registration into a course for which they cannot currently register. The course instructor must approve the override form before it is turned in to the department advisor.

<http://www.cecs.ucf.edu/web/wp-content/uploads/2018/03/Override-Form-2018-NEW.pdf>

Graduate Petition Form

This is a required form for graduate students who wish to request an exception to university policy. Students must submit an up-to-date program of study with the petition and rationale for the exception.

<http://graduate.cah.ucf.edu/files/graduatepetitionform.pdf>

Program of Study Templates

This is a contract between the student and the university specifying the courses necessary for graduation in a major. All students should fill out the appropriate POS and return it to the IEMS office for approval. This should be done before the end of the first semester. A student's Program of Study can be continually updated as course choice change and a student's plan evolves.

<http://www.iems.ucf.edu/admissions/graduate/PStemplates.html>

Graduate Special Registration Access Form

(Independent Study, Research, Thesis, and Dissertation)

This form is used to sign up for independent study, an internship, a research project, a thesis, and/or dissertation hours. The form must be completed and signed by the student and also by the instructor. The signed form goes to the Associate Chair and

then to the Academic Affairs office (located in ENGI, Room 107) where the student is registered for the course under the specific faculty member and agreed upon number of credit hours. The student must complete this form at least one week prior to beginning of classes, in case of unforeseen registration complications.

<http://www.cecs.ucf.edu/web/wp-content/uploads/2018/03/Graduate-Registration-Form-2018-NEW.pdf>

Special Leave of Absence Form

This form is required for students requesting a special leave of absence in order to temporarily waive the continuous attendance requirement. Students can request a maximum of 6 consecutive semesters of absence. Approval of this form will suspend the continuous enrollment in dissertation and/or thesis hours or before a student misses their third, consecutive term of enrollment. Students that are discontinued due to non-enrollment will have to be re-admitted into the program and follow the new catalog's curriculum for the doctoral program.

https://graduate.ucf.edu/wp-content/uploads/2018/01/Special-Leave-of-Absence_Online-3.pdf

Doctoral Committee/Candidacy Status Form

Students must fill out this form once they have passed the candidacy exam and before enrolling in dissertation hours. The absolutely latest this form can be filed with the department is the Thursday before the first day of classes. It will require approval of several people before being submitted to Graduate Studies and they must have the paperwork by noon on the Friday preceding the beginning of a term. At the time of Candidacy all integrity training must be complete and the majority of a student's courses complete.

If a student has a change in his or her committee membership, then this form will need to be re-filed with the department prior to their submission of their dissertation defense posting. All committee member must re-initial the form to reaffirm their commitment to serving on the student's new committee.

<https://graduate.ucf.edu/wp-content/uploads/2018/01/DoctoralCandidacyForm-1.pdf>

Traveling Scholar Request Form

This is a required form for graduate students who wish to attend another institution as a traveling scholar. The course work completed as a traveling scholar will add to a student's total transfer work. According to graduate policy, no more than half of a student's total program can be transfer work.

<http://graduate.cah.ucf.edu/files/travelingscholarform.pdf>

USEFUL LINKS

- [Academic Calendar](#)
- [Financial Aid](#)
- [Golden Rule](#)
- [College of Graduate Studies](#)
- [IEMS Department](#)
- [Institute of Industrial Engineers](#)
- [American Society for Quality](#)
- [MyUCF](#)
- [Office of Research](#)
- [Thesis and Dissertation \(ETD\)](#)
- [Library](#)
- [UCF Global](#)